

Lab 05: Binary Arithmetic

Operation	M	A	B	C4	S4 S3 S2 S1
7 + 5					
4 + 6					
9 + 11					

15 + 15					
7 – 5					
4 – 6					
11 – 2					
15 – 15					

Table C.1

C.3 Report

1. Comment on the use of the XOR gates and the M bit of the 4-bit adder-subtractor.
2. Write down your observations of the results from the addition and subtraction operations performed.

D Experiment 2: Ripple-Through-Carry Adder

D.1 Apparatus

- Trainer board
- 2 x IC 7483 4-bit binary adder

D.2 Procedure

1. Deduce the circuit diagram of an 8-bit ripple-through-carry binary adder using two 4-bit adders, clearly showing the pin numbers.
2. Construct the 8-bit adder.
3. Complete the operations in Table D.1.

Operation	A	B	Overflow Carry	Sum
7 + 5				
18 + 19				
72 + 83				
129 + 255				

Table D.1

D.3 Report

1. Comment on your observations of the results.

E Experiment 3: BCD Adder

E.1 Apparatus

- Trainer board
- 2 x IC 7483 4-bit binary adder
- 1 x IC 7408 quadruple 2-Input AND gates
- 1 x IC 7432 quadruple 2-Input OR gates

E.2 Procedure

1. Complete Table E.1 for the BCD sum.

Binary Sum					BCD Sum				
K	Z8	Z4	Z2	Z1	C	S8	S4	S2	S1
0	0	0	0	0					
0	0	0	0	1					
0	0	0	1	0					
0	0	0	1	1					
0	0	1	0	0					
0	0	1	0	1					
0	0	1	1	0					
0	0	1	1	1					
0	1	0	0	0					
0	1	0	0	1					
0	1	0	1	0					
0	1	0	1	1					
0	1	1	0	0					
0	1	1	0	1					
0	1	1	1	0					
0	1	1	1	1					
1	0	0	0	0					
1	0	0	0	1					
1	0	0	1	0					
1	0	0	1	1					

2. Construct the circuit of Figure E.1

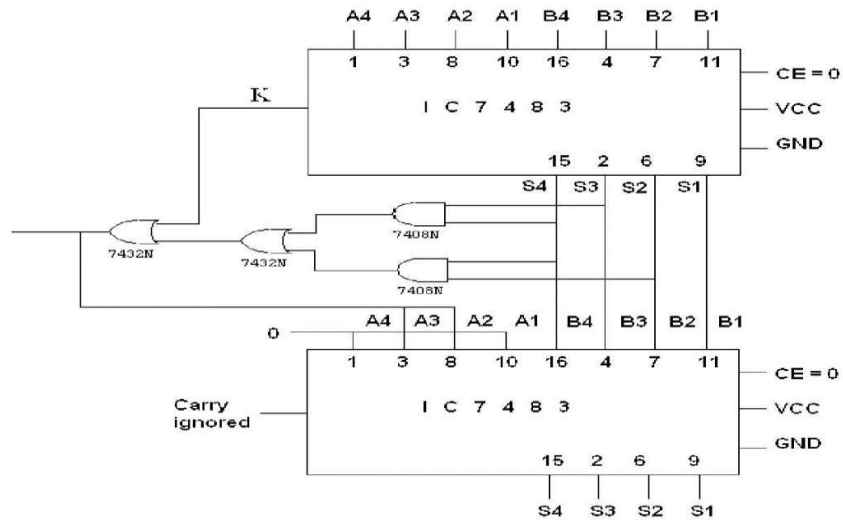


Figure E.1

3. Verify the outputs in Table E.2

Operation	A	B	Overflow Carry	Sum
9 + 0				
9 + 1				
9 + 2				
9 + 3				
9 + 4				
9 + 5				
9 + 6				
9 + 7				
9 + 8				
9 + 9				

Table E.2

E.3 Report

1. Derive the circuit for the BCD adder.